DiabetesAsia Journal

Diabetes Asia Journal
Vol. 1, Issue 3, Dec 2024, Edition: Online
Publisher: Diabetes Asia Journal under JHRC
eISSN: 3048-8192
Cross Ref DOI: 10.62996/daj.32122024
Journal Homepage: https://diabetesasia.org/journal/

Insulin resistance/hyperinsulinemia, a risk factor for Gestational Diabetes Mellitus

Rajesh Jain[1], Veeraswamy Seshiah[2]

[1]Dr Rajesh Jain MD chair, Diabetes Asia, Jain hospital & Research Centre, kanpur-208007, India. Email: jainhospitals@gmail.com; [2]Veeraswamy Seshiah MD, Distinguished Professor of The Tamilnadu MGR Medical University, Chennai, India.

We have overlooked an important factor in Gestational diabetes and diabetes pathogenesis. Insulin resistance (IR) and the associated hyperinsulinemia represent the earliest risk factors and risk factors responsible for a pandemic of diabetes and Cardiovascular diseases [1]. As a result, they are not screened early and are not treated for preventive purposes [2,3]. The prevalence of IR is around 51% of the total population in around the globe ranging differently as per ethnicity/race/area. IR start many years before the the diagnosis of prediabetes or type 2 diabetes by range of 10-15 years. IR are main driver for endothelial dysfunction (ED), Higher cholesterol, hypertrophy and concentric changes of the left ventricle, and hypertension due to inflammatory factors and reduced NO production, the activation of the sympathetic overdrive. In addition, high levels of circulating insulin hyperinsulinemia act as a growth factor, binding not only to insulin receptors but also to insulin growth factor-1 , with future consequences for the growth of tumours [4,5]."

Insulin resistance (IR) and hyperinsulinemia (elevated levels of insulin) exist in 30-70% of patients with heart failure (HF) and may play a crucial role in the pathogenesis of heart failure (HF) and reduced ejection fraction. This condition is characterized by the thickening of the left ventricle wall with lower relaxation and increased filling pressure, leading to congestion in the lungs and throughout the body. IR/hyperinsulinemia is also important in the development of cardiomyopathy of diabetes [6,7].

It has been shown that cellular apoptosis is associated with aging and various chronic conditions, and its levels are increased in adult obesity, DM T2 diabetes, non-alcoholic fatty liver disease (NAFLD) irrespective of aging. IR/hyperinsulinemia promotes the development of apoptosis/aging in human cells, metabolic tissues, adipose tissue, around major organs, and liver [8]. As a result, IR/hyperinsulinemia contributes to the progression of type 2 diabetes, tumours, cardiovascular changes, and cellular senescence, leading to a decreased quality of life, increased hospitalizations, substantial healthcare expenditures, and a significant rise in mortality.
The euglycemic-hyperinsulinemia clamp is the standard for diagnosing IR, but it is not practical for mass screening. However, surrogate markers as the Homeostatic Model Evaluation Index (HOMA-IR) and the triglyceride glucose index (TyG) have been found to as good as clamp results and could be used for this purpose. Triglyceride glucose index Various medications and natural substances are available for treating IR/hyperinsulinemia, as well as ways to improve lifestyle habits to address these conditions. The TyG index is computed as (fasting triglycerides mg/dl x fasting plasma glucose mg/dl/2).

References

[1]. Lifestyle Health Hub. Insulin resistance: The silent pandemic. https://hubpublishing.co.uk/insulin-resistance-the-silent-epidemic/

[2]. Samy I. McFarlane, Maryann Banerji, James R. Sowers, Insulin Resistance and Cardiovascular Disease, *The Journal of Clinical Endocrinology & Metabolism*, Volume 86, Issue 2, 1 February 2001, Pages 713–718, https://doi.org/10.1210/jcem.86.2.7202

[3]. Chiefari E, Mirabelli M, La Vignera S, Tanyolaç S, Foti DP, Aversa A, Brunetti A. Insulin Resistance and Cancer: In Search for a Causal Link. Int J Mol Sci. 2021 Oct 15;22(20):11137. doi: 10.3390/ijms222011137.
[4]. Freeman AM, Pennings N. Insulin Resistance. 2023 Aug 17. In: StatPearls: Treasure Island, (FL): StatPearls Publishing; 2023 Jan-. PMID: 29939616. [Google Scholar]

[5]. Lawrence MC, McKern NM, Ward CW. Insulin receptor structure and its implications for the IGF-1 receptor. Curr Opin Struct Biol. 2007 Dec;17(6):699-705. doi: 10.1016/j.sbi.2007.07.007. Epub 2007 Sep 11.

[6]. Ohya Y, Abebl., Fujii K, Ohmori S, Onaka U, Kobayashi K, Fujishima M. Hyperinsulinemia and left ventricular geometry in a work-site population in Japan. Hypertension. 1996; 27:729-734. doi:10.1161/01.hyp.27.3.729.

[7]. Fazio S, Mercurio V, Affuso F, Bellavite P. The Negative Impact of Insulin Resistance/Hyperinsulinemia on Chronic Heart Failure and the Potential Benefits of Its Screening and Treatment. Biomedicines. 2023 Oct 30;11(11):2928. doi: 10.3390/biomedicines11112928. PMID: 38001929; PMCID: PMC10669553.

[8]. Spinelli R, Baboota RK, Gogg S, Beguinot F, Blüher M, Nerstedt A, Smith U. Increased cell senescence in human metabolic disorders. J Clin Invest. 2023 Jun 15;133(12): e169922. doi: 10.1172/JCI169922.

- **Acknowledgment**

  Not applicable

- **Funding**

  Not applicable

- **Informed Consent**

  Not applicable

- **Conflict of Interest Statement**

  All the authors declared “No Conflict of Interest” with this publication.

The article is Open Access and are licensed under a Creative Commons Attribution 4.0 International License, visit http://creativecommons.org/licenses/by/4.0/

- **DOI:** 10.62996/daj.32122024

- **Cite this Article**

Rajesh Jain[1], Veeraswamy Seshiah[2]. **Insulin resistance/hyperinsulinemia, a risk factor for Gestational Diabetes Mellitus.** Diabetes Asia Journal.2024; 1(3):19-20. https://doi.org/10.62996/daj.32122024